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UNITED STATES DEPARTMENT OF AGRICULTURE FOREST SERVICE RO

REPLY TO: 3430 Evaluations DATE: December 31, 1984

SUBJECT: Pest Injury to Conifers in Christmas Tree Sale Areas on the Mi-Wok Ranger District (Report No. 84-48)

TO: Forest Supervisor, Stanislaus National Forest

In December 1983, pathologist Detlev Vogler and entomologist John Pierce examined two stands where white fir saplings had been cut for Christmas trees, and had subsequently suffered excessive needle loss (see Report No. 84-3). Although the cause of damage was a combination of adverse site and weather conditions, the District was nevertheless concerned that insect and disease pests might be a problem in future sales. On September 27, 1984, Vogler and Pierce returned to the District to examine several new sites selected for Christmas tree sales. Accompanied by Lyle Tallent and Dick Williamson, they visited five sale areas — Blitzen, Comet, Prancer, Dancer, and Vixen — as well as one stand where true fir needle cast was severe in 1983. Descriptions of the pests at each site follow.

Blitzen (near Stoddard Springs, Sec. 9, T.3N, R.17E). The most noticeable pest was a needle aphid (probably the balsam twig aphid, Mindarus abietinus), which had caused the needles of the current year's growth to twist and shrivel on most white firs. Only the cast skins of the aphids were present on the foliage in September. In some cases, the current year's shoot growth had died, leaving brown flags on the ends of the branches. According to some authorities, the needle drop, stunting, and twig distortion caused by this pest can render firs useless as Christmas trees for two to three years following attack. In addition, there were minor amounts of damage to white fir foliage caused by the Douglas-fir tussock moth (Orgyia pseudotsugata), needle cast fungi (both Virgella robusta and Lirula abietis-concoloris), and an unidentified needle gall midge (family Cecidomyiidae).

Comet (next to Blitzen, Sec. 16, T.3N, R.17E). The prevalence of aphid injury was similar to Blitzen, with most of the white firs affected to some degree. Injury by needle cast fungi was sparse to absent. The current growth of 5-10 percent of the firs was wilted to various degrees, as if the stand were under considerable moisture stress. The probable cause was several weeks of hot weather and low soil moisture, aggravated by aphid damage to the young needle tissues.

North Fork Sale Area (junction of roads 3N01 and 3N60). The stand was composed of 6-10 foot tall white firs beneath an overstory of 24-30 inch ponderosa pine and incense-cedar. True fir needle cast was readily apparent on most of the trees in 1983, and was abundant again in 1984. Many of the infected three-year-old needles had been cast prematurely, and some of the 1983 needles exhibited fruiting bodies of the fungus. The repeated fungus infection, needle browning, and premature needle cast can render these firs unsuitable for Christmas trees for the next several years, even if reinfection does not occur. Needle twisting caused by aphids was evident to some extent on most trees.

Prancer (Sec. 28, T.3N, R.17E). The site was adjacent to the Santa Sale from which firs cut in 1983 lost their needles within a week or two of being harvested. The sale area was heavily stocked with white fir and had a southwestern exposure; the needles were generally upright (vertical) on the twigs and gray-green in color, indicating that they received abundant sunlight. Some aphids were present, but needle twisting was far less evident than at Blitzen and Comet. Overall, the foliage had a decided yellow cast, particularly fourth year and older needles, suggesting that the trees were suffering from moisture stress, overstocking, or excessive exposure to light, or a combination of all three. Because they are growing at the lower elevational limits for true firs, trees in this vicinity may not have been hardened off sufficiently when they were cut in the fall of 1983, and thus were liable to dehydration and excessive needle loss. Judging from this experience and the overall appearance of the trees, further losses are possible, especially if weather conditions prevent the trees from becoming fully dormant before harvest.

Dancer (Sec. 33, T.3N, R.17E). This 100-tree white fir sale was close to the Prancer sale, but was more shaded, less heavily stocked, and had an eastern exposure. The leaf sprays were generally flat (horizontal with the ground) and the needles were a deep green, probably resulting from the shaded aspect of the site. No needle cast was observed, aphids were present but caused little damage, and there was little yellowing of the older foliage.

Vixen (Sec. 27, T.2N, R.17E). This sale comprised a mixture of Douglas-fir, white fir, and incense-cedar. The marked trees were the understory beneath a stand of sawtimber pines, white fir, and Douglas-fir, and were growing in a shallow, moist depression through which a small stream was meandering. Aphids were abundant on the white firs, but deformation of the needles and shoots was slight; true fir needle cast was present on two- and three-year-old needles, rendering many of them undesirable for Christmas trees. Many of the 60 Douglas-fir that had been marked for sale had sparse, yellow foliage that was chloroticly mottled or stippled. This damage is typical of that caused by spider mites (Family Tetranchyidae). Although we did not identify the causal agent in the field, it was probably the spruce spider mite (Oligonychus ununguis), which is a common pest of conifers throughout the world. It occasionally becomes a problem in the forest, where it thrives under hot, dry

conditions when its natural enemies are few and host vigor is poor. A minor problem of Douglas-fir was oviposition injury caused by female cicadas (family Cicadidae). The equally-spaced slits cut in the twigs callus to resemble small cankers.

MANAGEMENT ALTERNATIVES

No Change in Present Management. If the District continues to select Christmas tree sales based mainly on need for thinning and accessibility, insect and disease pest problems will continue to arise, often not becoming evident until after the sale is marked. In most cases this will not cause problems, since the buyers will view the trees before purchase and be able to bid based on the value of the trees as they are, pests and all. In some cases, as happened in 1983, a combination of site and weather conditions may cause trees to be damaged during or after harvest without advance warning.

Select Sites with Minimal Pest Impact. Proper training in pest identification will prevent the selection of Christmas tree sale sites where insect or disease pests are active. However, the very nature of the selection process may make the choice of pest-free stands difficult. Frequently, Christmas tree sales are marked in stands that are overstocked with sapling and small pole firs. Although such stands have an ample supply of trees that can be removed, the trees may have been so stressed by overstocking, shading, or other abiotic factors that they have become prey to insect and disease attacks. In all Christmas tree sales that we examined, some site conditions had caused or contributed to the abundance of pests. Nevertheless, it should be possible to select stands that both need thinning and are reasonably pest-free. To avoid problems caused by the failure of trees to harden off before harvest, the District should choose white fir stands in the mid- to upper-elevational range for the species.

Treat Christmas Trees with Insecticides or Fungicides. The pests found in these Christmas tree sale areas are seldom or never a problem in the general forest; if they were, silvicultural treatments would probably suffice. In ornamental or Christmas tree plantings, however, insecticides are commonly used to treat spider mite or aphid infestations, and may be effective in sale areas on the Mi-Wok District. In addition, fungicides may be effective against true fir needle casts, although field tests would be needed to confirm efficacy. Since conifers retain their needles for several years, the District would have to apply pesticides for at least two consecutive years to visibly improve the appearance of the trees. However, it is not known whether the monetary return from Christmas tree sales plus the benefits from thinning would outweigh the cost of multiple pesticide treatment. If the District wishes to use pesticides in Christmas tree sales, Forest Pest Management will provide information about those that are registered for use.

If you have questions or comments regarding this evaluation, please contact Detlev Vogler at (415) 556-6864.

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for WILFRED L. FREEMAN, JR.
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